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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,837	09/27/2006	Uli Paulus	095309.56093US	5846
23911 7590 06/08/2009 CROWELL & MORING LLP INTELLECTUAL PROPERTY GROUP P.O. BOX 14300 WASHINGTON, DC 20044-4300			EXAMINER NGUYEN, COLETTE B	
			ART UNIT 1793	PAPER NUMBER
			MAIL DATE 06/08/2009	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/529,837

**Applicant(s)**

PAULUS ET AL.

**Examiner**

COLETTE NGUYEN

**Art Unit**

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Status of the application***

*Claims 1 to 16 are amended; claims 17 to 20 are new. Claims 1 to 20 are presented for examination*

### ***Drawings***

1. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the details are not clearly marked or noted, especially, details 19,22,35,36,40. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.
2. **Claim 6** is objected to as spelling error. "In the exhaust gases.." should be "in..."

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. **Claim 2** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention. Claim 2 description and grammar are confusing and should be rewritten for clarity.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. **Claims 1-3, 8-11, 14 and 20** are rejected under 35 U.S.C. 102(b) as anticipated or in the alternative, under 35 U.S.C. 103(a) as obvious over Grasso (US2002/0164512).
5. **Regarding claims 1.** Grasso discloses a system and method for managing water coolant in a PEM fuel cell system wherein entrained/dissolved gases such as hydrogen and oxygen are separated from the liquid coolant and recycled back to combine with the fresh fuel or air at the incoming streams to the anode and the cathode. The separation is achieved by separation means located outside the fuel cell such as bubble trap, eductor, gas-liquid separator, etc...Grasso does not mention "providing an ignition source free discharge path" however, by providing an efficient separation system for hydrogen and oxygen from the liquid coolant, it would have been obvious to mean providing an ignition source free discharge path. All the critical elements of the method are encompassed by the teachings of Grasso (512).(Fig 1-7 and para,5-9)
6. **Regarding claims 2, 3,10,11** Grasso discloses a method as claim 1, wherein the gases such as air, and hydrogen are separated from the liquid coolant via separator/accumulator means (the calming vessel is one of the means disclosed), and the gases can be fed back to the incoming streams either to the anode or cathode. In case of air, it can be fed back as an oxidant supply.(para 30).It would have been obvious for one of ordinary skill in the art at the time of the invention to maintain the system pressure balance by means of pressure controls, using valves as shown in fig 7 of Grasso so proper air to fuel ratio is achieved as taught by Grasso. (fig 6 and 7 and para 32-35). As for the vent line upstream of the inlet to the calming vessel, if the bubble

trap is used as disclosed by Grasso, it would be obvious to have a vent line for the bubbles which are then trapped to the same gas/liquid separator/accumulator(para21).

7. Regarding claim 8. Grasso teaches to purge the separator/accumulator with air at start-up (para21).

8. Regarding claims 9, 14 and 20. Grasso teaches a system for water management in a fuel cell comprises: a fuel cell with anode and cathode, an air intake system, a fuel or hydrogen intake system, a gas/liquid separator such as a bubble trap, an eductor, or a cyclone separator/accumulator or a knock-out drum (Fig1-7) downstream of the cooler 29, with a gas line 67 and eductor 28 to control the gas pressure of the oxygen intake system (para 33). It would have been obvious for one of ordinary skill in the art at the time of the invention to substitute different equipment to achieve the system balance by using a valve instead of the eductor. However as both equipment are used for the same purpose they are anticipated.

9. claim 4,15,17 are rejected under 35 U.S.C. 103(a) as obvious over Grasso (US2002/0164512) in view of Lamm et al. (US6,521,366).

10. Regarding claims 4 and 17. Grasso teaches water system management in a fuel cell as claim1 wherein the gases are separated from the liquid coolant and the gases and liquids are efficiently recycled back. And in case of oxygen or air, it can be recycled back at the inlet of the cathode. However he is silent about the air filter. Lamm (366), in his invention of the fuel cell, discloses an air filter is provided upstream of the compressor 28 on the inlet area of the cathode supply line 20.(Col2, ln 45-48). It would

have been obvious for one of ordinary skill in the art at the time of the invention to recycle the air at the filter of cathode inlet so further filtering can be achieved for the air.

11. Regarding claim 15, Lamm discloses a moisture separator downstream of the discharge passage (Col3, In 14-17)

12. Claims 5, 6, 7, 12,13 and 16,18,19 . are rejected under 35 U.S.C. 103(a) as obvious over Grasso (US2002/0164512) in view of Masataka et al. (US6,294,277).

13. Regarding claim 5, 12, 16, 18 and 19. Grasso discloses a method and a system as claim 1 and 9, He does not disclose a hydrogen sensor and a control valve at the discharge to admix the hydrogen free air. Masataka (277) in his invention for a fuel cell for automotive, discloses a electromagnetic valve 33 at the discharge side of the anode 30 and air is introduced from the atmosphere (hydrogen free gas) at the catalytic combustor mounted in passage 30 (col 6, In 29-35). Both do not mention the hydrogen sensor at the discharge, however it would have been obvious for one of ordinary skill in the art at the time of the invention to have a sensor to activate the valve 33, as Masataka uses pressure sensor 25 at the inlet to control valve 33 (fig 1 and fig 6).

14. Regarding claim 6, 13. Grasso discloses a method of water management for a fuel cell as claim 1. He does not disclose that the exhausted gases from the fuel cell are passed over a catalyst by means of which the hydrogen concentration in the exhaust gases is reduced. Masataka(277), in his teaching of a fuel cell, discloses a catalyst at the exhaust passage of hydrogen. (Col6, In 33, "a catalytic combustor at the hydrogen discharge line 30"). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the teaching of Masataka with the teaching

of Grasso to provide an efficient system of separate and recycle the gases as much as possible or otherwise converted them as much as possible as a clean emission,

15. Regarding claim 7, Masataka teaches the control sequences of the fuel cell wherein the air intake 43 is turned on first at start up. ( Col 7, ln 25-35).

#### ***Examiner's Note***

The Examiner cites particular figures, paragraphs, columns and line numbers in the reference(s), as applied to the claims above. Although the particular citations are representative teachings and are applied to specific limitations within the claims, other passages, internally cited references, and figures may also apply. In preparing a response, it is respectfully requested that the Applicant fully consider the references, in their entirety, as potentially disclosing or teaching all or part of the claimed invention, as well as fully consider the context of the passage as taught by the reference(s) or as disclosed by the Examiner.

#### ***Conclusion***

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.US6,207,308, 5,441,821,

Any inquiry concerning this communication or earlier communications from the examiner should be directed to COLETTE NGUYEN whose telephone number is (571)270-5831. The examiner can normally be reached on Monday-Thursday, 10:00-4:00 PM.



If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curt Mayes can be reached on (571)-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/COLETTE NGUYEN/  
Examiner, Art Unit 1793

CN  
June 6, 2009

/Melvin Curtis Mayes/  
Supervisory Patent Examiner, Art Unit 1793